

CLAIMS

What is claimed is:

- 1 1. A die, comprising:
2 an insulation layer; and
3 an interconnect in the insulation layer, the interconnect having been formed
4 with its grain structure adapted to reduce electron scattering.
- 1 2. The die of claim 1, wherein the interconnect is adapted to have a bamboo
2 grain structure.
- 1 3. The die of claim 1, wherein the grain structure of the interconnect is adapted
2 by localized annealing.
- 1 4. The apparatus of claim 1, wherein the interconnect is formed with a material
2 selected from a group consisting of Cu, W, Au, Ag, Al, Cu alloy, W alloy, Au alloy,
3 and Al alloy.
- 1 5. The die of claim 1, wherein the die further comprises a diffusion barrier layer,
2 and the interconnect is formed on the diffusion barrier layer.
- 1 6. The die of claim 1, wherein the insulation layer having a thermal budget of less
2 than or equal to about 450 degrees Celsius.
- 1 7. The die of claim 1, wherein the grain structure of the interconnect is adapted
2 by localized annealing employing laser annealing.
- 1 8. The die of claim 1, wherein the grain structure of the interconnect is adapted
2 by localized annealing employing resistive annealing.
- 1 9. A method, comprising:
2 forming an insulation layer on a die; and
3 forming an interconnect in the insulation layer, including adapting its grain
4 structure to reduce electron scattering.

- 1 10. The method of claim 9, wherein said adapting comprises localized annealing
2 the interconnect.
- 1 11. The method of claim 10, wherein the localized annealing comprises laser
2 annealing using a selected one of a YAG, a CO₂ or an Ar⁺ laser.
- 1 12. The method of claim 10, wherein the localized annealing comprises laser
2 annealing using a CO₂ laser operating at about 50 to about 200 Watts and the
3 annealing time is in the range of about 1 to about 200 μ sec.
- 1 13. The method of claim 9, wherein the forming of an interconnect comprises
2 depositing a metal selected from a group consisting of Cu, W, Au, Ag, Al, Cu alloy, W
3 alloy, Au alloy, and Al alloy.
- 1 14. The method of claim 9, wherein the forming of an interconnect is in an
2 insulation layer having a thermal budget of less than or equal to about 450 degrees
3 Celsius.
- 1 15. The method of claim 9, wherein the adapting comprises localized annealing of
2 the interconnect by resistive annealing.
- 1 16. The method of claim 15, wherein the resistive annealing comprises coupling
2 an electrode to the interconnect.
- 1 17. The method of claim 16, wherein the electrode is an electrode used for
2 electroplating the interconnect.
- 1 18. The method of claim 16, further comprises passing an electrical pulse through
2 the interconnect via the electrode.
- 1 19. The method of claim 9, wherein the forming of an interconnect further
2 comprises forming a seed layer.
- 1 20. A system, comprising:

2 a die, including
3 an insulation layer; and
4 an interconnect imbedded in the insulation layer, the interconnect having
5 its grain structure adapted to reduce electron scattering;
6 a bus coupled to the die; and
7 a networking interface coupled to the bus.

1 21. The system of claim 20, wherein the interconnect is adapted to have a
2 bamboo grain structure.

1 22. The system of claim 20, wherein the grain structure of the interconnect is
2 adapted by localized annealing employing laser annealing.

1 23. The system of claim 20, wherein the grain structure of the interconnect is
2 adapted by localized annealing employing resistive annealing.

1 24. The system of claim 20, wherein the system is a selected one of a set-top box,
2 a digital camera, a CD player, or a DVD player.